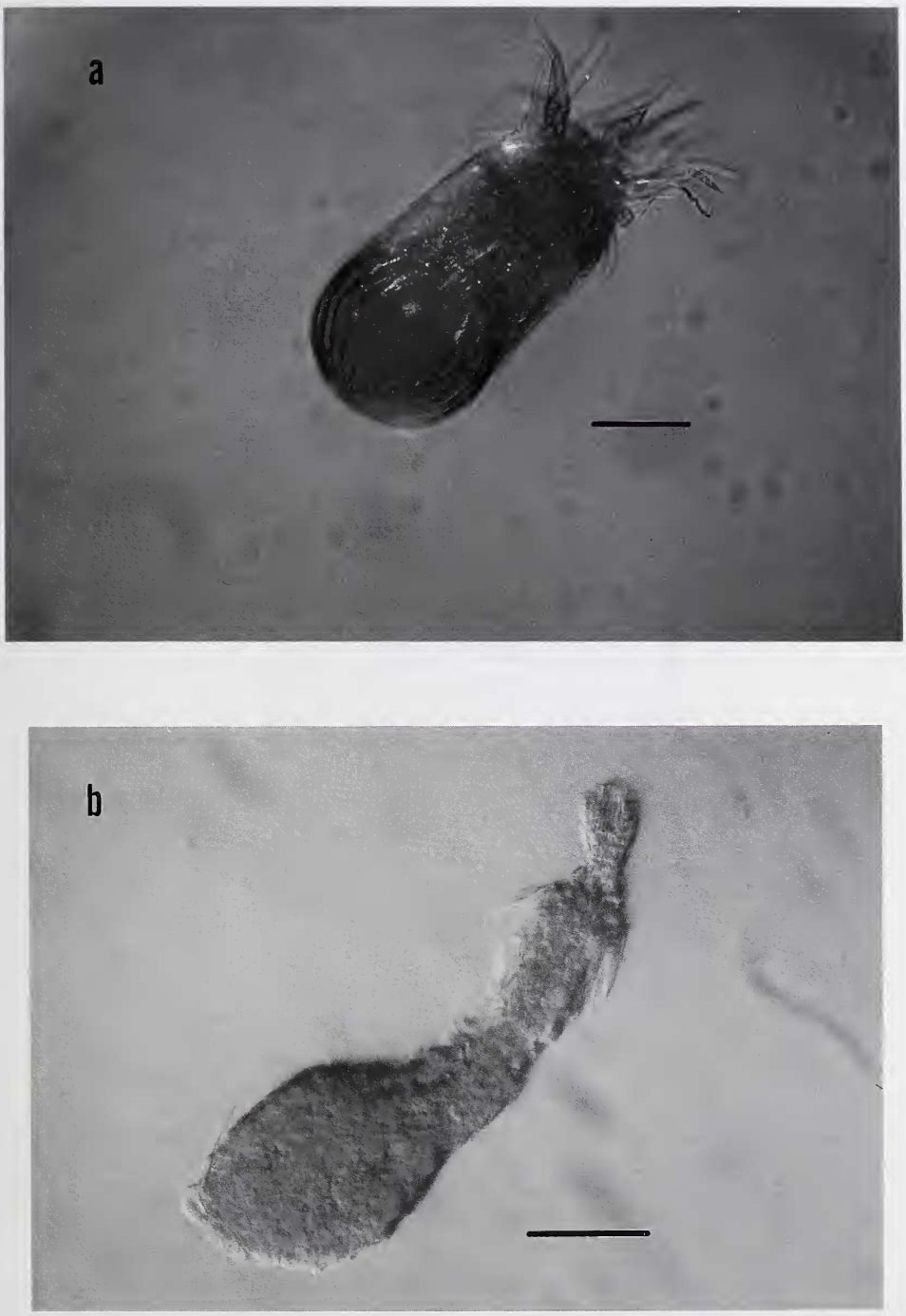

FIG. 1. Microscopic photographs of *Pliciloricus hadalis* sp. nov. a) Holotypic female. Ventral view. Note that the lorica is reflecting the light. b) Paratypic Higgins-larva. Lateral view. Scale bar = 50 μm.

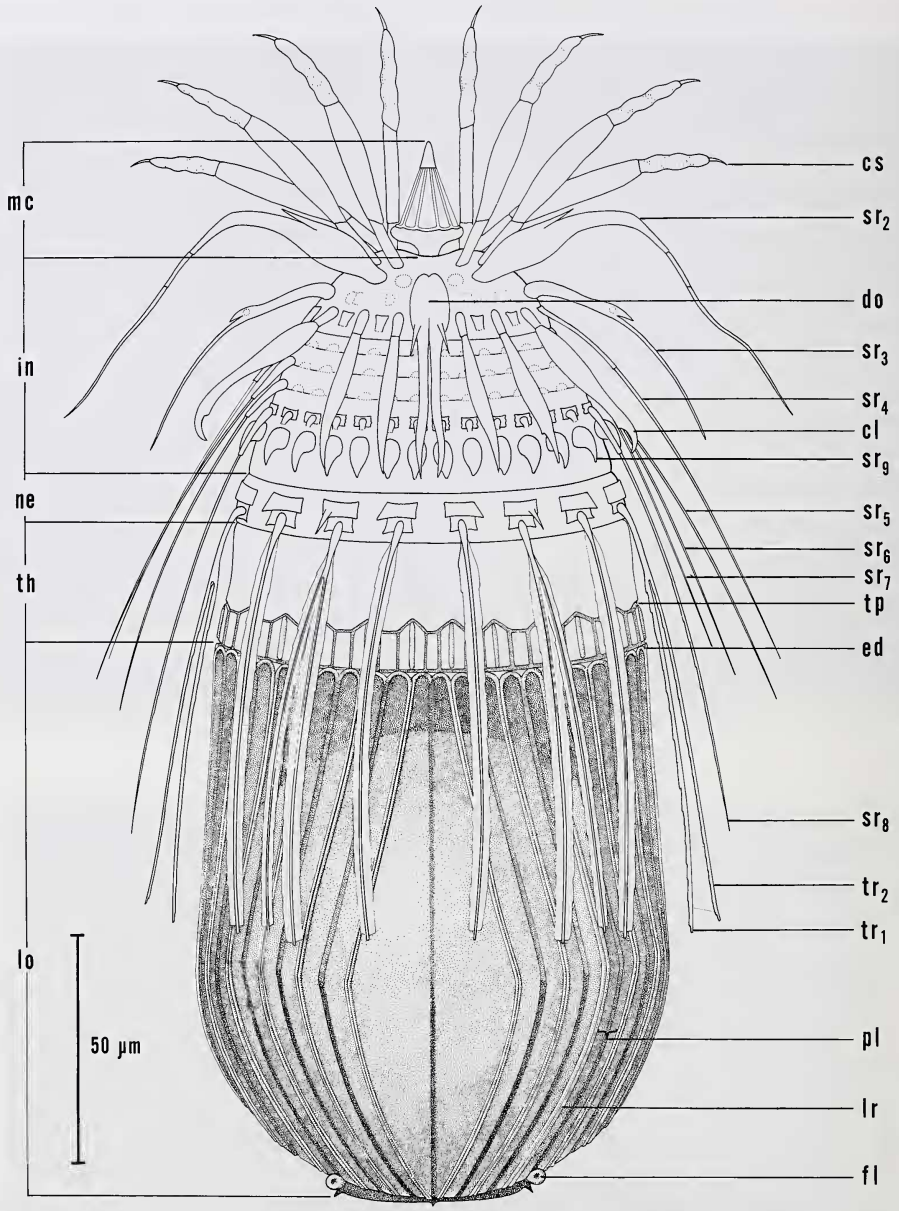

FIG. 2. Holotypic female of *Pliciloricus hadalis* sp. nov. collected in the Izu-Ogasawara Trench at a depth of 8260 m. Ventral view; cl=claw-tipped spinoscalids (sr_4); cs=clavoscalids (sr_1); do=double organ; ed=edge of lorica; fl=flosculus; in=introvert (head); lo=lorica; lr=double ridge of lorica; mc=mouth cone; ne=neck; pl=plica; sr_1–sr_9=scalid rows 1–9; th=thorax; tp=thoracical plate; tr_1=primary trichoscalid; tr_2=secondary trichoscalid.

cilium. Each of the double trichoscalids has a single base from which extend primary and secondary trichoscalids of nearly the same size.

The thorax has no appendages. The anterior part is unsculptured, with a very thin cuticle. The posterior part of the thorax is sculptured. The sculptured part consists of 15 small and 15 large plates. The large plate has a cuticular ridge. The thorax is well separated from the lorica. The lorica is a typical *Pliciloricus* type consisting with 22

double folds (plicae). The cuticle lacks the honeycomb structure found in many loriciferans. The anterior margin of the lorica has two arch-like structures associated with each of 22 plicae. The midventral plica differs only slightly from the other plicae. A single pair of posterior flosculi is present

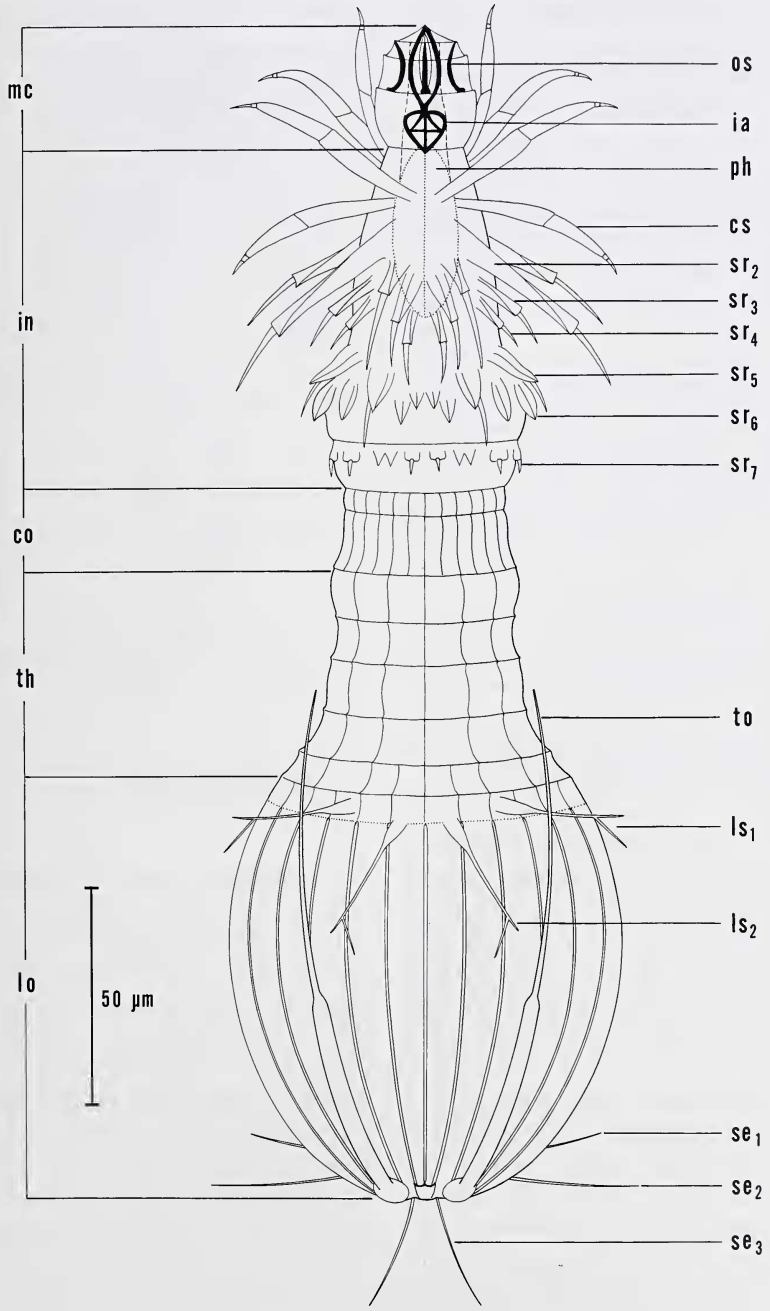

FIG. 3. Paratypic larva of *Pliciloricus hadalis* sp. nov. Ventral view. cs=clavoscalid (sr_1); co=collar; ia=internal armature of larval buccal canal; in=introvert; lo=lorica; ls_1=anterolateral seta; ls_2=anteroventral seta; mc=mouth cone; os=oral stylet; ph=pharyngeal bulb; se_1=posterodorsal seta; se_2=posterolateral seta; se_3=posteroterminal seta; sr_1–sr_7=scalid rows 1–7; th=thorax; to=toe.

in the ventral part of two other plicae. The shape of the lorica is atypical for the genus *Pliciloricus* that the lorica consists of a single piece and is shaped like a jar. The internal anatomy was destroyed in the holotypic female, but a single large egg has originally filled the abdomen. The gonopores are located caudo-dorsally close to the dorsal anus.

The allotypic male has retracted maximally and therefore is only 145 μm long. The mouth cone, the head, the neck and the unsculptured part of the thorax are located inside of the lorica. All appendages are oriented anteriorly and extruded from the anterior margin of the lorica in the opposite way to the fully extended female (first the trichoscalids, second the spinoscalids and third the clavoscalids). The internal anatomy is preserved in an excellent condition. Two large dorsal testes, each with a caudal seminal vesicle, contained filiform sperms. A pair of protonephridia is located close to the genital system. Both the anus and the two lateral gonopores are located caudo-dorsally.

The single paratypic larva is a typical Higgins-larva [2] of the *Pliciloricus* type (Figs. 1b and 3). It is 262 μm long with spinose toes (153 μm long). The mouth cone is tripartite, and the two terminal portions were slightly retracted telescopically. The head, the neck, the thorax and the abdomen extended completely. The mouth opening is surrounded by six cuticular valves. The internal mouth armature is hexaradially symmetrical with six stylet-like structures. The buccal canal consists of a heavily sclerotized mouth in front of the long oval pharyngeal bulb. The pharyngeal bulb is glandular and only a few myoepithelial cells are seen. The first row of appendages consists of the eight uniform clavoscalids, each of which consists of two laterally compressed basal segments and two spinose terminal segments. The spinoscalids of the second to the fifth rows consist of two segmented, long and robust scalids. The sixth row of head appendages consists of eight double scales, called protoscalids. The seventh row of appendages consists of seven protoscalids, forming a W-shaped structure, alternating with eight single papillae each located on a basal plate. The closing apparatus, or the collar [3], is formed by the neck when the head is retracted. It is regularly folded,

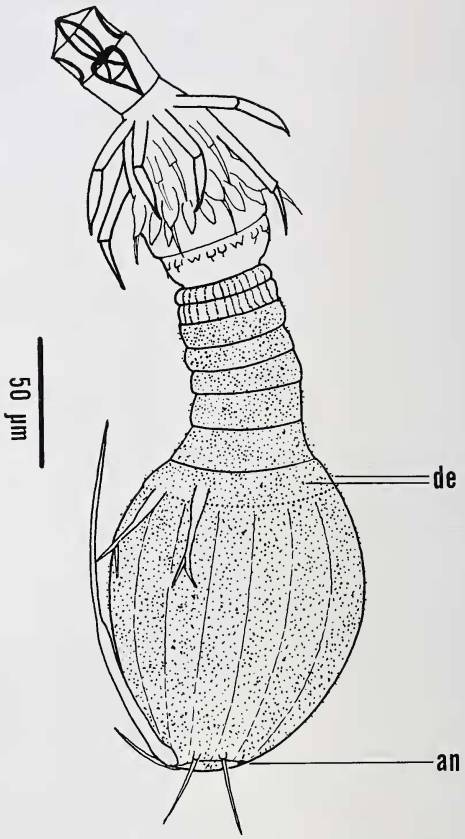

FIG. 4. Paratypic larva of *Pliciloricus hadalis* sp. nov. Lateral view. an=anus; de=detritus.

but lacks collar pores. The thorax has five rows of 15 to 20 plates, forming an accordion-like system.

The larval lorica has a thick unsculptured cuticle with 20 ridges. The fine structure of the lorica is hidden by a mucous layer, on which detrital material attached (Fig. 4). The abdomen is very wide (87 μm) and balloon-shaped. The very long toes extend from the lateroventral region of the caudal end and is oriented anteriorly. About 40% of the proximal length of the toes is hollow, while the remaining terminal 60% narrows to a solid spine. The two pairs of anterior lorical setae are branched near the tip. The three pairs of posterior lorical setae are simple. The caudal pair of lorical setae (inserting near the dorsal anus) are hollow and perhaps glandular. Flosculi are absent.

DISCUSSION

Only five species, *Pliciloricus orphanus*, *P. profundus*, *P. enigmaticus*, *P. gracilis* and *P. dubius*, have been described previously for the genus. The present species, *P. hadalis*, is closely related to *P. orphanus* and *P. profundus*, on the basis of its larval characteristics, and to a lesser extent to *P. enigmaticus* and *P. gracilis*. The larva of *P. dubius* is unknown. The adult of *P. hadalis* closely resembles *P. profundus* in the presence of single pair of posterior flosculi, the type of mouth cone and clavoscalids and the claw-shaped spinoscalids. Unique to *P. hadalis* is the shape of the lorica of both adults and larva, the mucous coat on the larval lorica and the 30 sculptured plates in the adult thorax.

The habitat of *Pliciloricus hadalis* is different completely from the other congeneric species. All described species so far have been found exclusively from sublittoral coarse sediments off the southeastern coast of the U.S.A., e.g. coarse quartz sand of 400–439 m, coarse oolytic sand of 294 m and medium black phosphorite sand of 289 m deep [3]. On the other hand, *P. hadalis* was found from very fine red clay at 8260 m in the Western Pacific Ocean. This finding reveals that the genus *Pliciloricus* thus far is the most eurybathic meiofaunal genus. Moreover, in contrast to the interstitial nature of the other species, *P. hadalis* most probably burrows within the sediment, because it was collected not only from the surface but also from the subsurface layer of the sediment. Such wide variety of habitats as well as modes of life suggest that *Pliciloricus* has the ability to adapt to various environmental conditions without marked modification in morphology. In addition to *P. hadalis*, we have three additional undescribed deep-sea loriciferan species and even an undescribed family from the Shatzky Rise, central Pacific at depths of 2430 and 3160 m, and still more species are being discovered from various areas of the world ocean. These data suggest a ubiquitous distribution of Loricifera not only in the coastal waters but also in the deep sea. Considering that loriciferans are now known to comprise many species and genera, and are distributed widely in various types of marine sediments, it is astonishing that this group of animals was not described until 1983. The reason probably lies in the labor necessary for the intensive process of meiofaunal research, the magnitude of required patience, and luck.

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Mites of the Genus *Myobia* (Trombidiformes, Myobiidae) Parasitic on *Apodemus* mice in Korea and Japan, with Reference to their Immature Stages[1]

KIMITO UCHIKAWA, KEISUKE NAKATA[2] and FRITZ S. LUKOSCHUS[3]

Department of Parasitology, Shinshu University School of Medicine, Matsumoto 390,
[2]Hokkaido Forest Experiment Station, Bibai, Hokkaido 079-01, Japan, and
[3]Department of Aquatic Ecology, Catholic University, Nijmegen, The Netherlands

ABSTRACT—*Myobia nodae*, *Myobia apodemi*, *Myobia agraria* and *Myobia kobayashii* were taken from *Apodemus speciosus* sspp., *Apodemus argenteus*, *Apodemus agrarius* (Korea) and *Apodemus peninsulae* sspp. (Korea and Hokkaido), respectively, suggesting that each mite is so strictly monoxenic or specific to a host species that it may serve as an indicator in the classification of *Apodemus* in Korea as well as in Japan. Immature stages of the 4 *Myobia* species were depicted and measured. It was demonstrated that these mites were identified almost correctly in the proto- and deuto-nymphal stages and precisely in the tritonymphal stage, making mites of the genus *Myobia* more reliable indicators in the host classification.

INTRODUCTION

The genus *Myobia* von Heyden, 1826, is associated exclusively with the rodent family Muridae. *Myobia musculi* (Schrank) infesting *Mus musculus* was described as early as in 1781, and its morphology has been observed in detail since that time. In Japan, a total of 5 species within the genus *Myobia* has been recorded as monoxenic mites occurring on mice of the genera *Mus*, *Micromys* and *Apodemus* [1], suggesting that these mites may serve as labels in classifying host mice. *Myobia kobayashii* Uchikawa *et* Mizushima, 1975, is the fifth species found on *Apodemus giliacus* (=*A. peninsulae*) subsequent to the finding of this mouse in Hokkaido by Kobayashi and Hayata in 1971 [2]. If myobiids of *Apodemus* mice had thoroughly investigated much earlier, the occurrence of *A. giliacus* there could have suggested from acarological data.

Mammalogists' interest currently been concerned with systematics of *Apodemus* mice distributed in Korean Peninsula and mainland China [3, 4]. To cope with this trend, a double-purposed study of mites of the genus *Myobia* parasitic on *Apodemus* in Korea and Japan was carried out. First, *A. agrarius* and *A. peninsulae* from Korea and *A. speciosus tusimaensis* from Tsushima Island, Japan, located between Japan and Korea were examined for myobiids specific to them. Second, immature stages of all *Myobia* species parasitic on *Apodemus* mice from Japan and Korea were compared with one another to check the usefulness of them as indicators in host classification. Incidentally, those stages usually occur more abundantly on hosts than adults, and are not exactly studied yet morphologically.

MATERIALS AND METHODS

Skin specimens of *A. peninsulae*, Hang-ge-ryon, Kanwangdo, Korea, 1981–VII–9, alcoholic specimens of *A. agrarius*, Monehi, Korea, 1951–VIII–27, and *A. speciosus tusimaensis*, Hisada, Tsushima Island, Japan, 1957–VI–13, all of which are deposited in the collection of the National Science Museum, Tokyo, were examined for myobiids under the dissecting microscope at a magnification ×10, combing hairs with the forceps. Mites were

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[1] We began this study together, but Dr. Fritz S. Lukoschus passed away before reading the manuscript of the present paper.